Citation:

Murakami K, Sasaki S, Okubo H, Takahashi Y, Hosoi Y, Itabashi M. Dietary fiber intake, dietary glycemic index and load, and body mass index: A cross-sectional study of 3931 Japanese women aged 18-20 years. *Eur J Clin Nutr.* 2007 Aug; 61(8): 986-995.

PubMed ID: 17251928

Study Design:

Cross-Sectional Study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the associations of total, soluble and insoluble dietary fiber intake and dietary glycemic index and glycemic load with body mass index (BMI) in Japanese women.

Inclusion Criteria:

Female dietetic students aged 18 to 20 years from one of 54 universities, colleges and technical schools in 33 of 47 prefectures in Japan.

Exclusion Criteria:

- Women who were in an institution where the survey had been conducted at the end of May
- Those with extremely low or high reported energy intake (less than 2,093 or more than 16,744kJ per day)
- Those with missing information on variables.

Description of Study Protocol:

Recruitment

Dietetic students were recruited during an orientation session or first lecture designed for freshman who entered dietetic courses in April 2005.

Design

Cross-sectional study.

Dietary Intake/Dietary Assessment Methodology

Dietary habits during the previous month were assessed using a previously validated, self-administered diet history questionnaire.

Statistical Analysis

- Multivariate adjusted means (standard error) of BMI were calculated by quintiles of dietary variables
- Linear trends with increasing levels of dietary variables were tested by assigning each subject the median value for the category and modeling this value as a continuous variable.

Data Collection Summary:

Timing of Measurements

Dietary history and lifestyle characteristics during the previous month were assessed by questionnaire within two weeks of when the freshman dietetic courses began.

Dependent Variables

BMI.

Independent Variables

- Total, soluble and insoluble dietary fiber
- Glycemic index
- Glycemic load.

Control Variables

- Residential block
- Size of residential area
- Current smoking
- Current alcohol drinking
- Current dietary supplement usage
- Rate of eating
- Energy intake
- Percentage of energy from protein
- Percentage of energy from fat.

Description of Actual Data Sample:

- *Initial N:* 4,060
- *Attrition (final N):* 3,931
- *Mean age:* (SD) 18.1 (0.3) years
- *Ethnicity:* Japanese
- *Other relevant demographics:*
  - 19.9% lived in a city with a population at least one million
  - 15.2% lived in a town or village
- *Anthropometrics:* Mean (SD) BMI was 21.0 (2.8) kg/m^2
- *Location:* Japan.

Summary of Results:

Body Mass Index [Mean (Standard Error)] According to Quintiles of Total, Soluble and Insoluble Dietary Fiber Intake and Dietary Glycemic Index and Load Among 3,931 Japanese Women Aged 18 to 20 Years

Variables	Quintile 1 of Dietary Variable	Quintile 2 of Dietary Variable	Quintile 3 of Dietary Variable	Quintile 4 of Dietary Variable	Quintile 5 of Dietary Variable	P-value for Trend
BMI (kg/m^2) by quintiles of total dietary fiber intake[a,b]	21.1 (0.1)	21.1 (0.1)	21.1 (1.1)	20.8 (0.1)	20.7 (0.1)	0.006
BMI (kg/m^2) by quintiles of soluble fiber intake[a,b]	21.2 (0.1)	21,1 (0.1)	21.1 (0.1)	20.9 (0.1)	20.6 (0.1)	0.0004
BMI (kg/m^2) by quintiles of insoluble fiber intake[a,b]	21.1 (0.1)	21.0 (0.1)	21.1 (0.1)	20.9 (0.1)	20.7 (0.1)	0.008
BMI (kg/m^2) by quintiles of dietary glycemic index[a,c]	20.8 (0.1)	20.9 (0.1)	21.0 (0.1)	21.0 (0.1)	21.2 (0.1)	0.03
BMI (kg/m^2) by quintiles of glycemic load[a,c]	20.5 (0.2)	20.7 (0.1)	20.9 (0.1)	21.2 (0.1)	21.5 (0.2)	0.0005

[a] Adjusted for residential block, size of residential area, current smoking, current alcohol drinking, current dietary supplement use, currently trying to lose weight, rate of eating, physical activity level, energy intake, percentage of energy from protein, percentage of energy from fat.

[b] Additional adjustment for glycemic load.

[c] Additional adjustment for total dietary fiber intake.

Other Findings

- The negative correlation between total, soluble or insoluble dietary fiber intake and BMI was significant after controlling for potential confounders
- Dietary glycemic index and glycemic load were positively correlated with BMI after controlling for potential confounders
- The adjusted mean value of BMI for the combination of a high total dietary fiber intake and a low dietary glycemic index (20.3 kg/m^2) was significantly lower than that for the combination of a low total dietary fiber intake and a high dietary glycemic load (21.6kg/m^2,

P=0.04). A similar relation was seen for glycemic index and BMI.

Author Conclusion:

Dietary fiber intake was independently negatively correlated with BMI, and dietary glycemic index and glycemic load were independently positively correlated with BMI after adjustment for potential dietary and non-dietary confounders in relatively lean Japanese women aged 18 to 20 years.

Reviewer Comments:

Author-identified limitations and comments:

- *Physical activity level was assessed by a limited number of non-validated questions.*
- *The study results may not be extrapolated to general Japanese populations because the subjects selected were female dietetic students who may be highly health conscious*
- *BMI was calculated from self-reported height and weight, and dietary assessment was also self-reported.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	No

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	No
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	N/A
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	N/A
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	N/A

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	???
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes

7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	No
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes